

32. (Amended) The method of Claim 31 wherein the prism arrays include peaks and valleys that alternate orientation along a second axis different than the first axis.
33. (Amended) The method of Claim 31 wherein the prism arrays include peaks and valleys that alternate orientation along a third axis different than the second axis and the first axis.

REMARKS

Claims 1-34 are presently pending, with Claims 13-15, 19-24, and 34 being withdrawn from further consideration as being drawn to a non-elected invention.

Objection to the Drawings

The Examiner objected to the drawings under 37 C.F.R. § 1.83(a) as not showing every feature of the invention specified in the claims. More particularly, the Examiner has objected to the drawings for not showing the features of Claims 5-9, 16-18, 25, 26, 28, 29, 32, and 33.

Figures 12A-15 are submitted herewith for the Examiner's approval. No new matter is believed added in that the subject matter shown in each figure is described in the specification of the originally filed patent application. In particular, Figure 12A is a top view of the luminaire 11 of Figure 6 having peaks 26 and valleys 28 perpendicular to the longitudinal axes of linear prisms 12'. Figure 12B is a sectional view of the luminaire of Figure 12A taken along line 12B-12B. Figure 12C is a sectional view of the luminaire of Figure 12A taken along line 12C-12C. Support for these figures is provided on page 2, lines 5-8; page 2, lines 14-15; page 10, lines 3-9; and Claims 5, 6, 20, 28, and 32 of the originally filed specification.

Figure 13A is a top view of a luminaire having peaks 26 and valleys 28 offset at about 60 degree intervals. Figure 13B is a sectional view of the luminaire of Figure 13A taken along line 13B-13B. Figure 13C is a sectional view of the luminaire of Figure 13A taken along line 13C-13C.

Figure 13D is a sectional view of the luminaire of Figure 13A taken along line 13D-13D. Support for this figure is provided on page 2, lines 5-10; page 2, lines 14-15; page 10, lines 11-14; and Claims 5, 7, 8, 9, 20, 21, 29, and 33 of the originally filed specification.

Figure 14 is a perspective view of a luminaire having multi-planar facets. Support for this figure is provided on page 2, lines 27-28; page 10, lines 20-21; and Claims 16 and 24 of the originally filed specification.

Figure 15 is a perspective view of a luminaire having curved prism tips and valleys. Support for this figure is provided on page 2, lines 28-29; page 10, lines 21-22; and Claims 17, 18, 25, and 26.

Objection to the Specification

The Examiner objected to the disclosure because on page 1, line 18, the term "sides" is incorrect, according to the Examiner, in view of the following term "each" on the same line and page.

The sentence beginning on page 1, line 18 has been amended to clarify that the tilted prism can have two sides which meet at a peak, with a first length from the valley to the peak on one side and a second length from the valley to the peak on a second side of the prism to clarify this particular sentence. It is respectfully submitted that the rejection is overcome.

The Examiner has also objected to the specification on page 4, line 26 because the serial number for the U.S. application has not been provided.

The specification has been amended on page 4, line 26 to provide the application number for the application having our docket number 1571.1140-001, which was filed on the same date as the present application.

The Examiner objected to the specification under 35 U.S.C. § 112, first paragraph, as failing to provide an enabling disclosure of the invention. According to the Examiner, "it is not clear whether the cross-sectional view taken along line 10-10 as seen in Figure 10, on line 7 of page 10, is referred to the cross-sectional view of the prism 12' or is referred to the cross-sectional view of the row of linear prisms having peaks 26 and valleys 28 formed perpendicular to the longitudinal axis of the prism 12' as recited on lines 5 to 6 of page 10."

Figure 10 is a cross-sectional view taken along line 10-10 of Figure 6 and is thus a view of a cross-section of prisms 12' that one would see of the peaks 26 and valleys 28 formed perpendicular to the longitudinal axes of prisms 12'. Figure 12 also illustrates this embodiment.

The Examiner also notes that "[o]n page 10, lines 10 to 14, the description is not understood, illustration of the drawings would be helpful."

Figure 13 illustrates an exemplary embodiment of a luminaire disclosed on page 10, lines 11-14. In this particular embodiment, the peaks and valleys are offset at about 60 degree intervals.

Objection to the Claims

Claims 25 and 26 were objected to by the Examiner in that Claims 25 and 26 are identical to Claims 17 and 18.

Claims 25 and 26 have been amended to depend from independent Claim 19 instead of Claim 1. It is believed that this amendment overcomes the Examiner's objection.

Claim Rejection under 35 U.S.C. § 112, Second Paragraph

The Examiner objected to Claims 3, 5-9, 28, 29, 32, and 33 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

The Examiner notes that in Claim 3 the language "the linear prisms have included angles of 25, 90 and 65 degrees" is not clear. The Examiner has posed the question whether different prisms have different angles or each prism has the angles of 25, 90, and 65 degrees. The Examiner has also stated that "it is not clear which angles are in respect to what frame of references."

It is respectfully submitted that the language in Claim 3 is clear in view of the specification on page 4, lines 14-17. Each prism in the prism array has included angles of 25, 90, and 65 degrees. The peak has an included angle of 90 degrees, the first side of the prism forms a 25 degree angle from the horizontal to the peak, and the second side of the prism forms a 65 degree angle between the horizontal and the peak. Accordingly, this objection is respectfully traversed.

The Examiner rejected Claims 5-8, since there is not clear antecedent basis for "the first axis".

Claim 5 has been amended to depend from Claim 4, thereby providing support for "the first axis" and overcoming the Examiner's rejection to these claims.

The Examiner rejected Claim 28, stating that "it is not clear how can the prism arrays periodically alternate . . . along a second axis while the same prism arrays already periodically alternate . . . along a first axis as recited in Claim 27." The Examiner has also rejected Claim 29, stating that "it is not clear how can the prism arrays periodically alternate . . . along a third axis while the same prism arrays already periodically alternate . . . along a second axis as recited in Claim 28 and the same prism arrays already periodically alternate . . . along a first axis as recited in Claim 27?"

Claims 28 and 29 have been amended to recite that the prism arrays include peaks and valleys that periodically alternate orientation along a second axis and along a third axis, respectively. Thus, the claims have been amended in accordance with Claims 5 and 8 of the present application. The corresponding specification on page 2, line 14; page 3, lines 4 and 6; and page 10, lines 4-6 has been amended for clarification purposes. No new matter has been added.

The Examiner has also rejected Claims 32 and 33 stating that it is unclear how the prism arrays can periodically alternate orientation along a second axis and a third axis, respectively.

Claims 32 and 33 have been amended similar to Claims 28 and 29, i.e., to specify that the prism arrays include peaks and valleys that alternate orientation along a second axis different than the first axis, and a third axis different than the second axis and the first axis. No new matter has been added.

The Examiner has also noted that Claim 9 depends on rejected Claim 8 and as such is also rejected.

It is respectfully submitted that the rejection to Claim 8 has been overcome with the amendment to Claim 5, and thus Claim 9 is in compliance with 35 U.S.C. § 112, second paragraph.

Claims Rejected under 35 U.S.C. § 102(b)

The Examiner rejected Claims 1, 2, 4, 10, 12, 27, and 30 under 35 U.S.C. 102(b) as being anticipated by Rudisill *et al.* (U.S. Patent 5,339,179). The Examiner looks to Figure 5c of Rudisill *et al.* to reject independent Claims 1 and 27. It is noted that the specification of Rudisill *et al.* that describes Figure 6 appears to be actually referring to Figure 5c, i.e., Figure 5c of Rudisill *et al.* should be Figure 6 or the specification should be amended to recite Figure 5c instead of Figure 6.

In any event, it is respectfully submitted that Rudisill *et al.* do not teach all of the limitations of independent Claims 1 and 27. Specifically, Rudisill *et al.* do not teach a plurality of tilted prism arrays that periodically alternate orientation along a light guide. The "prism arrays" of Rudisill *et al.* are described at column 6, lines 46-51 as "[p]its in the top surface 72 [having] preselected wall angles to increase the useable light gathering or viewing angle range provided by the panel. Pits, like pit 76, have wall angles of 45°, while pits like pit 78 have wall angles of 15° relative to a line normal to the top surface 72."

There is no teaching of the periodic alternation of the orientation of the prism arrays as recited in independent Claims 1 and 27. The term "periodic" can be defined as occurring at regular intervals. As set forth on page 4, lines 19-21 of the present application, the prism arrays alternate or flip-flop in orientation, for example, one to two millimeters. As set forth on page 2, line 19 *et seq.*, a purpose of the periodic alternate orientation of the prism angles is to create alternating bands of bright and dark lines which can be seen viewing the surface of the luminaire. Further, the pitch prisms that are not visible to the human eye beyond 0.5 meters can be made to look like macro prisms because of the visibility of the bright and dark bands. Low cost manufacturing concepts, such as continuous casting, can be used to form the precision fine pitch alternating prism groups and achieve the appearance of a precision macro prism, for example, 0.508 to 2.54 mm (0.02 to 0.1 inch) pitch, which would normally be made with a more expensive manufacturing concept, such as compression molding.

In contrast, Rudisill *et al.* do not teach this periodic alternate orientation of prism arrays. Thus, Claims 1, 2, 4, 10, 12, 27, and 30, which recite periodic alternation of prism arrays, are believed to patentably distinguish over Rudisill *et al.*

The Examiner rejected Claim 31 under 35 U.S.C. § 102(b) as being anticipated by Rudisill *et al.*

Claim 31 recites tilted prism arrays that periodically alternate orientation along a first axis and thus patentably distinguishes over Rudisill *et al.* similar to the arguments above.

Claim Rejection under 35 U.S.C. § 103(a)

The Examiner rejected Claims 3 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Rudisill *et al.*

Claims 3 and 11 respectively depend directly and indirectly from independent Claim 1 and thus contain the limitation of periodic alternation of orientation of prism arrays which is believed to patentably distinguish over Rudisill *et al.* Accordingly, the rejection is respectfully traversed.

The Examiner rejected Claims 1-4, 10-11, 17, 18, and 25-27 as being obvious in view of Ishikawa *et al.* (U.S. Patent 5,971,559). The rejection is respectfully traversed.

Rejected independent Claims 1, 19, and 27 specifically recite tilted prism arrays that periodically alternate orientation along the light guide. As shown in Figure 2 of the present application, prisms 12 alternate orientation along the light guide at regular intervals. In contrast, the concave portions 5 in Ishikawa *et al.* can vary in size and frequency along the length of the light conducting member 1. When two light sources are employed, for example, in the embodiments of Figures 14-17 in Ishikawa *et al.*, the orientation of the concave portions flip or mirror one another, but do not periodically alternate orientation, i.e., at regular intervals. The concave portions 5 in Figures 14-17 of Ishikawa *et al.* at best alternate orientation once. Accordingly, the rejection with respect to Ishikawa *et al.* is respectfully traversed.

Allowable Subject Matter

The Examiner has stated that Claims 5 to 9, 28, 29, 32, and 33 would be allowable if rewritten to overcome the rejections under 35 U.S.C. § 112, second paragraph, set forth in the Office Action and to include all of the limitations of the base claim and any intervening claims.

As noted above, it is respectfully submitted that these claims depend from allowable claims.

The Examiner objected to Claim 16 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 16 depends from Claim 1 which, as noted above, is believed to patentably distinguish over the cited references.

The Examiner has stated that "Claims 5 to 9, 16, 28, 29, 32 and 33 contain allowable subject matter because the prior art does not teach the combination of the periodically alternating

orientations of the prism arrays along different axes with peaks and valleys along different axes as claimed."

As set forth above, it is respectfully submitted that these claims depend from independent claims that contain patentable subject matter over the cited references.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner believes that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

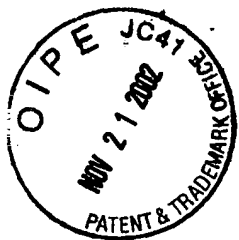
Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By Erik L. Ence
Erik L. Ence
Registration No. 42,511
Telephone: (978) 341-0036
Facsimile: (978) 341-0136

Concord, Massachusetts 01742-9133

Dated: November 18, 2002



RECEIVED
NOV 25 2002
TECHNOLOGY CENTER 2800

MARKED UP VERSION OF AMENDMENTS

Specification Amendments under 37 C.F.R. § 1.121(b)(1)(iii)

Please replace the paragraph at page 1, line 12 through page 2, line 4 with the following paragraph:

A luminaire is provided which includes a light source, a light guide that receives light radiating from the light source, and a plurality of tilted prism arrays for redirecting the light in a first direction. In one embodiment, the plurality of prism arrays, which can include linear prisms, periodically alternate orientation along the light guide. The linear prisms can have included angles of 25, 90, and 65 degrees. The prism arrays can alternate or flip-flop in orientation every few millimeters, for example, one to two millimeters. A tilted prism can have two sides [on each side of the] which meet at a peak with a first length from the valley to the peak on one side and a second length from the valley to the peak on a second side of the prism, where the first length is different in length from the second length, thereby tilting or canting the prisms. The tilting angle of the prisms is between the optical axis and a line perpendicular to the window side. The tilting angle can be in the range between about 20 and 70 degrees.

Please replace the paragraph at page 2, lines 12-26 with the following paragraph:

An optical microstructure is also provided which includes a plurality of tilted prism arrays that periodically alternate orientation of the tilted prism arrays along a first axis. The prism arrays can also include peaks and valleys that periodically alternate orientation along a second axis and, in alternative embodiments, along a third axis. The optical microstructure can be disposed on a first surface of a film. A plurality of prism arrays can be disposed on a second surface of the film. The plurality of prism arrays on the second surface can be tilted and periodically alternate orientation along at least one axis. The purpose of the periodic alternate orientation of the prism angles is to create alternating bands of bright and dark lines which can be seen viewing the surface of the

luminaire. Very small or fine pitch prisms that are not visible to the human eye beyond 0.5 meters can be made to look like macro prisms because of the visibility of the bright and dark bands. Low cost manufacturing concepts, such as continuous casting, can be used to form the precision fine pitch alternating prism groups and achieve the appearance of a precision macro prism, for example, 0.508 to 2.54 mm (0.02 to 0.1 inch) pitch, which would normally be made with a more expensive manufacturing concept, such as compression molding.

Please replace the paragraph at page 2, lines 27-29 with the following paragraph:

Multi-faceted prisms can be used, for example, prisms that have more than one slope on a facet. Further, prisms can be used which have curved facets or curved [prisms] prism tips and valleys. These features are used to smooth the resulting light distribution.

Please replace the paragraph at page 3, lines 1-7 with the following paragraph:

A method for redirecting light is also provided which includes providing a light source, receiving light radiating from the light source in a light guide, and redirecting the light in a first direction with a plurality of tilted prism arrays that periodically alternate orientation along a first axis. The plurality of tilted prism arrays can include peaks and valleys that periodically alternate orientation along a second axis different than the first axis. The plurality of tilted prism arrays can further include peaks and valleys that periodically alternate orientation along a third axis which is different than the second axis.

Please replace the paragraph at page 4, lines 23-28 with the following paragraph:

The waveguide 10 can be solid being formed from a material such as polymethyl methacrylate (PMMA) or other suitable materials. In alternative embodiments, any of the prisms disclosed herein can be used with hollow waveguides in any of the embodiments as disclosed in U.S. Application No. [] 09/725,338, [Attorney's Docket No. 1571.1140-001,] filed on [even date herewith,] November 29, 2000, the contents of which are incorporated herein by reference.

Please replace the paragraph at page 10, lines 3-14 with the following paragraph:

For example, in the embodiment of Figure 6, a two-dimensional prism structure can be constructed by forming [a second array of linear prisms perpendicular to the linear prisms 12'. More particularly, a row of linear prisms having] peaks 26 and valleys 28 [is formed] perpendicular to the longitudinal [axis] axes of the existing linear prisms 12', i.e., into the paper. Thus, a cross-sectional view taken along line 10-10 is seen in Figure 10. If the prisms are spaced apart, the peaks 26 will have a flat portion as also illustrated in Figure 10. Figure 11 illustrates an enlarged view of the prisms of Figure 6 which illustrates peaks 26 and valleys 28 of the prism arrays. This facilitates controlling of the light rays exiting the waveguide at every angle. In alternative embodiments, the peaks and valleys can be offset at about 60 degree intervals to provide a three-dimensional structure. In further embodiments, the peaks and valleys can be offset at various angles to provide a multiple-dimensional structure.

Please replace the paragraph at page 10, lines 20-23 with the following paragraph:

In any of the disclosed embodiments, multi-faceted prisms can be used, for example, prisms that have more than one slope on a facet. Further, prisms can be used which have curved facets or curved [prisms] prism tips and valleys. These features can be used to smooth the resulting light distribution.

Claim Amendments under 37 C.F.R. § 1.121(c)(1)(ii)

5. (Amended) The luminaire of Claim [1] 4 wherein the prism arrays include peaks and valleys along a second axis different than the first axis.
25. (Amended) The luminaire of Claim [1] 19 wherein the prism arrays include curved prism tips.
26. (Amended) The luminaire of Claim [1] 19 wherein the prism arrays include curved valleys.

28. (Amended) The luminaire of Claim 27 wherein the prism arrays include peaks and valleys that periodically alternate orientation along a second axis.
29. (Amended) The luminaire of Claim 28 wherein the prism arrays include peaks and valleys that periodically alternate orientation along a third axis.
32. (Amended) The method of Claim 31 [further comprising the step of periodically alternating the plurality of tilted prism arrays] wherein the prism arrays include peaks and valleys that alternate orientation along a second axis different than the first axis.
33. (Amended) The method of Claim 31 [further comprising the step of periodically alternating the plurality of tilted prism arrays] wherein the prism arrays include peaks and valleys that alternate orientation along a third axis different than the second axis and the first axis.